SKID ASSEMBLY FOR FREIGHT CONTAINERS

This invention relates to a skid assembly for securement to the underside of a freight container in order to assist the loading and unloading of the freight container relative to a load platform.

Freight containers usually are designed in different standard sizes, and are used widely to transport goods via road, rail, ship and in aircraft.

The present invention has been developed primarily, though not exclusively, in connection with freight containers for transportation by aircraft, and which typically are of smaller size, and usually referred to as "mini container". However, it should be understood that a skid assembly according to invention is applicable to freight containers generally, to be secured to the underside thereof, and to assist the loading and unloading relative to a load platform.

With transport by aircraft, the loading constraints of an aircraft usually dictate that small containers only can be loaded and unloaded with respect to the load platform/floor of the aircraft. It is usual to transport mini containers to and/from an aircraft by other means of transport, and with the containers forming assembled modules of more than one mini container e.g. TRICON or QUADCON for three and four modules/mini containers respectively.

The modules are assembled by coupling together adjacent "corner fittings" of the containers using clamping devices, usually referred to as "twistlocks".

Typically, aircraft intended for the transportation of cargo only are fitted with roller tracks and guides at set pitches within their decks, to allow palletted cargo to be rolled in and out with relative ease. Existing pallets typically have dimensions of 2590 x 2438 x 40 to 70 mm thick, and are usually manufactured from aluminium sections which are welded together. Along the two edges of the pallet which contact the guides on the aircraft deck, a castellated tooth formation is produced to allow locking pins slidably mounted on the aircraft deck to travel up through the guides and engage the castellations when the pallet has been advanced to the required location. The pallets are also equipped with lashing points to allow the cargo to be strapped down to the pallet, either by chains or nylon webbing.

In recent years, it has been desirable to be able to ship mini containers in such transport aircraft. Typically, mini containers are capable of being assembled in modules to form a container assembly of standard length of twenty foot. As referred to above, mini containers may be designed as individual modules of appropriate size, to make up a twenty foot assembly, comprising four modules in a QUADCON, three modules in a TRICON, or two modules when each mini container is half size.

Although such containers are fitted with lifting fittings usually, to standard ISO1161, there has been no provision to lock them to the floor of the aircraft, and when chain lashings are used, this has led to severe damage, and the use of excessive time to secure and unsecure. Given in particular the demands of military transport aircraft, it is highly desirable, and often essential, that the loading and unloading times be kept to an absolute minimum, given the hazardous environments in which the aircraft may be operating. Existing mini containers have great integral strength, and do not require the loading pallet to distribute the load. They do, however, require a flat area to contact the roller tracks and the provision of the castellated tooth system to provide the required locking of the pallet.

The present invention seeks to provide a skid assembly for securement to the underside of a freight container, in order to assist the loading and unloading of a freight container relative to a load platform e.g. on an aircraft floor, and which does not require use of pallets, while providing an arrangement which can be loaded and unloaded easily, and also be secured and unsecured readily in a shorter period of time than with existing palletting techniques.

According to the invention there is provided a skid assembly for securement to the underside of a freight container, in order to assist the slidable loading and unloading of the container relative to a loading platform, said container having upper and lower corner fittings to enable the container to be clamped to one or more adjacent container(s) and/or support surfaces, and the skid assembly being arranged to be capable of extending between a pair of lower corner fittings, and to be securable thereto in order to secure the skid assembly to the underside of the container, in which the skid assembly comprises:

an elongate support having upper and lower support surfaces, the lower support surface being engageable with a loading platform and the upper support surface being engageable with the underside of the container; and

a pair of clamping devices mounted one adjacent to each end of the elongate support and engageable with a respective one of the pair of lower corner fittings to secure the skid assembly to the underside of the container.

Thus, the skid assembly of the invention can be readily secured to the underside of a freight container, and to be clamped securely to a pair of lower corner fittings of the container, and then the skid assembly can engage slidably with a load platform to load and unload the freight container.

In a particularly preferred application of the invention, the freight container is a mini container which is intended to be loaded and unloaded with respect to a support deck or platform of an aircraft intended for cargo transportation, and usually provided with a floor having roller supports, and with longitudinal guides and locking elements.

The skid assembly may be a simple metal fabrication, preferably made of hollow sections to reduce the weight. At least some of the hollow sections may be filled with structural foam to increase the strength of the sections and resistance to bending loads, and also to distribute loads whilst minimising overall weight.

The elongate support of the skid assembly preferably includes two longitudinally extending load-bearing surfaces, a first of which is intended to engage and to support the lower surface of the pair of lower corner fittings, and a second of which is laterally spaced from the first surface and which is intended to engage and to support the underside of the base of the container.

It is usual for the lower corner fittings of a container to project downwardly by a small amount relative to the base of the container, so that vertical loads applied by the container to an underlying support e.g. a lower container on which it is stacked, are transmitted via the corner fittings and suitably strengthened columns at each corner of the container.

The second load-bearing surface is therefore at a slightly raised level relative to the first load-bearing surface, so that it can engage with the base of the container.

To compensate for any manufacturing tolerances and/or damage to the underside of the base, it is preferred that a load transfer pad forms the second load-bearing surface. Conveniently, the pad comprises a longitudinal strip of resiliently deformable material e.g. a rubber pad, which is secured to the upper surface of the skid assembly.

For some customers, it may be acceptable to manufacture the skid assembly with a length to suit the spacing apart of the pair of lower corner fittings of the particular container with which it is to be used. However, to provide a common design of skid assembly for use with different containers, the elongate support may be fabricated in two parts which are longitudinally adjustable to vary the overall length of the skid assembly. In a preferred arrangement, the two parts are telescopically adjustable.

A locking mechanism may be provided to lock the two parts in any required position of lengthwise adjustment.

In a particularly preferred embodiment, the skid assembly comprises a main wide box section, and a pair of narrower hollow sections each running longitudinally along a respective one of the opposed longitudinal sides of the main section. One of the hollow sections preferably has a support section secured thereto, is generally triangular in cross-section, and of which an upper and horizontal side has the load-bearing pad secured thereto.

The other hollow section may have a number of lateral projections secured thereto, and spaced apart longitudinally to define locking spaces there-between, into which fastening bolts on the loading platform can engage to restrain the skid assembly longitudinally.

The lateral projections preferably comprise wear resistant sliding portions e.g. made of heavy duty plastics, to engage slidingly with the guides usually provided on the loading platform of an aircraft.

The clamping devices preferably comprise rotatable clamping heads which are biassed to a retaining position, but which are moveable against the biassing to an entry position in which the head can enter the respective corner fitting.

Preferably, the heads are shaped so as to be engageable by the edge of the entrance aperture to the corner fitting (when the heads are in the engaged position), and thereby to be moved to the entry position. The heads are then received by the corner fittings, and when properly located therein, the biassing returns the heads to the retaining position. This then securely fastens the skid assembly to a pair of lower corner fittings of the container.

Usually, a pair of skid assemblies will be provided, to support each container, and then enable the container readily to be loaded and unloaded by slidable movement of the skid assemblies over rollers built into the loading platform.

A preferred embodiment of skid assembly according to the invention will now be described in detail, by way of example only, with reference to the accompanying drawings, in which:

figure 1 is a perspective illustration of an assembly of four mini container modules to form a so-called QUADCON, which forms a standard ISO module, and which can be transported by road, rail or ship in assembled form, and which can subsequently be disassembled for individual loading of the modules utilising a skid assembly according to the invention;

figure 2 is a side view of a skid assembly according to the invention secured to the underside of a mini container module;

figure 3 illustrates the module as it moves relative to a loading platform of an aircraft, having roller supports;

figure 4 is a perspective illustration, partly in plan, of the skid assembly itself;

figure 5 is a detailed view showing an in-board part of the skid assembly, supporting a corner fitting and part of the base of the container;

figure 6 is a perspective view from above, in detail view, of an opposite side of the skid assembly, as it engages guides provided on the loading platform of an aircraft;

figure 7 is a detailed plan view of the skid assembly accordingly to the invention;

figure 8 is a side view corresponding to figure 7; and

figure 9 is a diagrammatic side view of a container and skid assembly supported on a roller floor.

Referring now to the drawings, and particularly figure 1 thereof, this illustrates in perspective view a typical QUADCON assembly of four mini containers, secured together to form a standard ISO module for transport by road, rail and/or ship. The assembly is designated generally by reference 10, and comprises four mini containers 11 joined together side by side to form a rigid assembly which can be transported as a unit. Each module 11 has four upper corner fittings 12 and four lower corner fittings 13. A typical dimension of a standard mini container is eight foot long and five foot wide, and when loaded on an aircraft, usually the mini container will advance in a width-wise direction.

The corner fittings are rigidly clamped together by any one of a number of different proprietary types of clamping heads and twistlocks, all of which will be well

known to those of ordinary skill in the art, and which need not be described in detail herein. However, when
the QUADCON assembly has been delivered to an aircraft, the assembly must then be broken up into individual modules, which are then loaded individually on to the loading deck of the aircraft. This is achieved by utilisation of a skid assembly according to the invention, which will be described in more detail, with reference to the remaining figures of drawings.

The skid assembly according to the invention which will be described is intended for securement to the underside of a freight container, in order to assist the slidable loading and unloading of the container relative to a loading platform. The container has upper and lower corner fittings 12, 13 to enable the container to be clamped to one or more adjacent container(s) and/or support services, and the skid assembly is arranged to be capable of extending between a pair of lower corner fittings, and to be securable thereto in order to secure the skid assembly to the underside of the container.

In general terms, the skid assembly comprises an elongate support having upper and lower support surfaces, the lower support surface being engageable with a loading platform and the upper support surface being engageable with the underside of the container.

The skid assembly also includes a pair of clamping devices mounted one adjacent to each end of the elongate support, and engageable with a respective one of the pair of lower corner fittings to secure the skid assembly to the underside of the container.

Figure 2 shows an end view of a container 11, looking in the direction of a pair of openable doors 14 and 15, and having a pair of lower corner fittings 13 supported by a skid assembly according to the invention, designated generally by reference 16. The skid assembly 16 supports the pair of corner fittings 13, and also the underside of the container 11 extending between the corner fittings 13.

Figure 3 is a view taken at right angles to the view of figure 13, and is showing one of the long sides of the mini container 11 facing, as the container moves on to a roller type of loading platform of a cargo type of aircraft. Figure 3 shows the loading deck or platform of the aircraft, designated generally by reference 17, provided with roller supports 18, and with the skid assembly 16 slidably engaging the rollers to allow loading and

unloading movement of the container. The skid assemblies 16 also engage with and are guided by longitudinally extending guides 19 provided on the loading deck.

Figure 4 is a perspective view from above of the skid assembly 16. The skid assembly 16 is a simple metal fabrication, made of hollow sections to reduce weight. At least some of the hollow sections are filled with structural foam to increase the strength of the sections and also the resistance to bending, and to distribute load whilst minimising overall weight.

The skid assembly 16 essentially comprises an elongate support 20 having an upper surface which engages the lower bases of the corner fittings, and also the underside of the container, as will be described in more detail below. The skid assembly also has a lower surface (not shown in figure 4) which is engageable with the rollers of the loading platform.

A pair of clamping devices 21 are mounted one adjacent to each end of the elongate support 20, and engageable with a respective one of the pair of lower corner fittings 13 to secure the skid assembly to the underside of the container.

Figure 5 is a detail end view of part of the skid assembly, and shows a central main box at section 22 of rectangular cross-section, and an in-board narrow hollow section at 23. A support ledge 24 is secured to the base of a hollow section 23 and is of generally triangular cross-section, of which a horizontal upper side 25 supports a longitudinally extending load-bearing surface provided by one or more resilient load-bearing pad 26, preferably made of rubber, which serves the purpose of distributing the load uniformly.

It will be noted from the detail of figure 5 that the corner fitting 13 is supported by the main box section 22, whereas the underside of the container is supported by the pads 26. As per usual practice, the corner fitting 13 projects a small distance downwardly of the lower surface 27 of the underside of the container, which allows easy stacking, and also ensures that, in normal transport use, the corner fittings and the vertical columns at each end of the container take the vertical load.

There is also shown in figure 5 an actuating arm 28, which can operate one of the clamping heads of clamping device 21. The clamping device 21 may comprise spring biassed clamping heads, which are normally biassed to take up a retaining position, but which can be moved against the biassing to an entry position, upon a downward engagement of the corner fitting 13 with the head, so that the head can then be received

within the corner fitting, and then under its biassing takes up again the retaining position, whereby to firmly secure the clamping device 21 to the corner fitting 13, and thereby secure the skid assembly 16 to the underside of the container. The actuating arm 28 may be operated manually to release the clamping head from the corner fitting, when it is desired to uncouple the skid assembly from the container.

Figure 5 shows the in-board side of the skid assembly, whereas the detail of figure 6 shows in more detail, in plan and partial perspective view, the outboard edge of the skid assembly.

Referring briefly back to figure 4, the outboard edge of the skid assembly 16 is designated by reference 29, and it will be seen that a number of lateral projections at 30 are provided on the outboard edge 29, and which are longitudinally spaced apart to define locking gaps or apertures that run there-between, into which locking bolts (not shown) on the loading platform can engage, to restrain the skid assembly (and the container secured thereto) against longitudinal movement.

Figure 6 shows the projections at 30 sliding within guides 32 provided at the edges of the loading platform of the aircraft.

The lateral projections 30 are triangular in cross-section, and made of hardwearing material, typically hard plastics, such as nylon.

Referring to figures 7 and 8, this shows in more detail the constructional features which assemble to form the skid assembly 16. Parts already described are given the same reference numerals. The skid assembly 16 comprises two main parts which are longitudinal adjustable relative to each other, to vary the overall length of the skid assembly to suit any particular design of container. The two parts are designated by references 33 and 34, and which are shown in figures 7 and 8 in position of minimum overall length, where they butt against each other. They can, however, be telescopically adjusted, to increase the overall length of the assembly, whereby the clamping heads 35 can be brought into registry with the pair of lower corner fittings to which the skid assembly is to be secured. Figures 7 and 8 show in phantom outline a longitudinally adjusted position of the skid assembly, with greater overall length.

The outboard side 36 of the skid assembly is provided with the lateral projections 30, as referred to above with reference to figures 4 and 6. The inboard side 37 forms a load-bearing surface, along with load transfer pad or pads 38 are secured. A releasable

locking mechanism (not shown in detail) is provided to lock the two parts 33 and 34 of the skid assembly 16 in any required longitudinally adjusted position.

Figure 9 shows diagrammatically a container (and skid assembly secured thereto) supported by a roller-type floor on load platform of an aircraft.